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Respiratory morbidity and neurodevelopmental outcomes in infants born preterm: A complex web

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Yu et al. report the identification of distinct early-life longitudinal trajectories of respiratory support that are associated with neurodevelopmental outcomes in infants born preterm.¹ The most widely used marker of respiratory status in the neonatal intensive care unit (NICU), bronchopulmonary dysplasia, is known to correlate with long-term neurodevelopmental outcomes.² This study enriches prior work linking respiratory status in the NICU with neurological outcome by incorporating detailed early-life longitudinal data, as well as by using objective clustering analyses, as opposed to expert opinion, to identify distinct groups.

The causal pathways underpinning the relationship between respiratory support in the NICU and neurodevelopmental outcomes are likely to be complex.³ One possibility is simply that respiratory status acts as a marker of severity of illness, either cross-sectionally or longitudinally, and that its link with neurodevelopment is not of a directly causal nature. A second possibility is that pulmonary and neurological morbidity share common causal antecedents, such as infection, inflammation, or microbiome alterations. Preterm birth itself is of course the most significant common antecedent for both pulmonary and neurological morbidity. Third, pulmonary disease, and the interventions we use to support it, may trigger biological mechanisms that directly contribute to neurological injury. Possible mechanisms could include, but are not limited to, inflammation, intermittent hypoxia, and altered early-life human interactions.^{2,4} However, it is probable that all three types of potential causal relationships between respiratory disease and neurological morbidity are at play. The lung-brain axis in infants born preterm is likely a complex web rather than a straightforward pathway.

The current findings reported by Yu et al. identify infants at high risk for neurodevelopmental impairment by 8 weeks of age, based on clinical variables and respiratory trajectory.¹ This risk stratification could facilitate targeted referrals for intensive neurodevelopmental monitoring and intervention, as well as selection of infants for trials of novel interventions. Future research directions could include identification of biomarkers associated with each respiratory trajectory, which could further elucidate the biological mechanisms underlying the associations of the trajectories with neurodevelopmental impairment.

DATA AVAILABILITY STATEMENT

Not required

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This commentary is on the original article by Yu et al. on pages 1246–1253 of this issue.

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